

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Thus, claims 1 and 7 have been amended to indicate that the dispersant comprises an aliphatic hydrocarbon solvent as a main component, in partial response to the rejection of the claims under 35 U.S.C. §112.

Claim 4 has been amended in consideration of the disclosure in paragraph [0025] on page 7 of the substitute specification, which indicates that the dispersant has the recited volume resistivity, and the hydrocarbon solvent has the recited boiling point range.

New claim 8 has been added to the application, and results from a combination of claims 1-5.

The rejection of claims 1-7 under the second paragraph of 35 U.S.C. §112 is respectfully traversed.

As indicated above, claim 1 has been amended to avoid the expression "mainly consisting of", and now recites that the dispersant comprises an aliphatic hydrocarbon solvent as a main component, which means that the amount of the aliphatic hydrocarbon solvent in the dispersant is greater than any other component which may be present in the dispersant. In answer to the Examiner's question of whether the dispersant can contain other substances, as indicated in the first paragraph on page 9 of the specification, the dispersant can contain other substances. A key feature of the dispersant is that the polymer must be soluble in the dispersant, as recited in claim 1. The other components which may be included in the dispersant should therefore permit satisfaction of this requirement.

The Examiner also takes the position that the term "derivative thereof" confuses the scope of the claims. However, Applicant respectfully submits that this term is commonly used in the chemical field in patent claims (for instance, see claims 3 and 9 of USP 4,681,896, and claims 1-4 and 13 of USP 4,415,554, copies of which are enclosed), and therefore, does not render the scope of the claims indefinite.

For these reasons, Applicant takes the position that the rejection of the claims under 35 U.S.C. §112 should be withdrawn.

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

Thus, the rejection of claims 1-6 under 35 U.S.C. §102(b) as being anticipated by Nicholls et al. taken in view of the evidence in Shibata et al. is respectfully traversed.

As indicated above, an important feature of the presently claimed invention is that the ink jet ink include a polymer having a specific general formula which is **soluble in a dispersant**, wherein the dispersant is or mainly contains an aliphatic hydrocarbon.

The polymer, along with a metal soap, provides a good dispersing ability of a colorant as shown in Table 1 of the specification, and the excellent dispersion of the colorant originates from an excellent charging control function of a combination of the soluble polymer and the metal soap. The polymer further has a function of fixing the colorant onto a recording medium (see page 7, lines 28-32 of the substitute specification).

For the purpose of obtaining the solubility, the most preferable combination of monomers and their chemical formula is specified in the present specification as having long chains to be able to dissolve in the hydrocarbon dispersant (claims 3 and 8).

On the contrary, Nicholls et al. disclose "**insoluble chargeable marking particles**" as one of the main ingredients (column 3, line 3), which is made of a copolymer of 2-ethyl hexyl acrylate and vinyl acetate and several kinds of pigments.

Even though one of the monomers used is the same, the resultant copolymer is quite different as between the present invention and the copolymer used as a colorant of Nicholls et al.. It is well known that the chemical and physical characteristics of a polymer differ according to the monomer composition and copolymerization ratio.

Applicant emphasizes that the polymer is soluble in the present invention, while the copolymer of Nicholls et al. is insoluble in the hydrocarbon dispersant. Further, Nicholls et al. are silent about the specific chemical formula (having an alkyl group of 4 to 22 carbon atoms) of the polymer of the present invention, much less about the fixing property of the soluble copolymer.

With regard to Shibata, he discloses "the color material is dispersed into **the resin which is insoluble to the solvent**" (column 11, lines 15-16), and discloses nothing about a soluble polymer.

Though, he specifically discloses a ζ potential, the ζ potential is known as an important factor for dispersing materials in a solvent. Applicant notes that the main purpose of the present invention is not to provide a specific ζ potential, but to provide a most suitable ink jet ink containing a soluble polymer, and thus in the present application the ζ potential is only claimed in a dependent claim.

The rejection of claims 1-6 under 35 U.S.C. §102(b) as being anticipated by Baker et al. taken in view of the evidence in Ueda et al. is respectfully traversed.

Baker et al. also disclose a (co)polymeric core "**that is insoluble in the carrier liquid**" (column 4, line 21). The insoluble (co)polymeric core is a gel organosol, that has an ability to form a three dimensional gel of controlled rigidity (Abstract).

Baker et al. disclose acrylic or methacrylic monomers having long side chains such as lauryl acrylate or dodecyl acrylate, but, like in the case of Nicholls et al., the obtained (co)polymers never dissolve in the carrier liquid, that is a dispersant. Moreover, Baker et al. disclose the polymer gel has a specific rigidity, meaning the polymer gel does not dissolve in the dispersant and maintains its shape in the dispersant.

As discussed in the case of Nicholls et al., chemical and physical properties of a copolymer differ according to the monomer composition, and use of one common monomer does not always result in the same copolymer.

With regard to Ueda et al., they only disclose anthraquinone derivative pigments containing alkyl radicals, and disclose nothing about a copolymer, much less about a solubility of the copolymer.

The rejection of claims 1-7 under 35 U.S.C. §102(e) as being anticipated by Kato in view of the evidence in Ueda et al. is respectfully traversed.

The comments set forth above concerning the Ueda et al. reference are equally applicable to this rejection.

Though Kato discloses a soluble resin for dispersion stabilization in one process for the preparation of resin particles which are finally dispersed in a solvent, it should be noticed that **the soluble resin finally becomes one part of the resin particle and becomes insoluble in the solvent.**

As is clearly disclosed in claim 1 and in the specification of Kato, the soluble resin should have a part in the main chain to be crosslinked (for example, column 3, line lines 44-45, and column 59, lines 16-17).

It is also disclosed in Kato under the Preparation Examples of Resin Particles (column 43) that the soluble resin is mixed with functional monomers and solvent, and then, heated with polymerization initiator such as AIBN to react with the monomers. Finally, the resin particles precipitated are collected by centrifuging, dried (for example column 44, lines 26-28) and used in an ink. The process clearly shows the ink does not include unreacted "resin for dispersion stabilization", which is removed at the process of collection.

The ink of Kato may have good dispersion properties, but the process includes many polymerization processes and total processes are extremely troublesome.

On the contrary, according to the present invention, a stable ink jet ink can be obtained only by dispersing the ingredients which include a dispersant-soluble copolymer.

For these reasons, Applicant takes the position that the presently claimed invention is clearly patentable over the applied references.

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

Kenji OSHIMA

By:

A handwritten signature in black ink, appearing to read "Michael R. Davis", with a checkmark at the end of the signature.

Michael R. Davis
Registration No. 25,134
Attorney for Applicant

MRD/pth
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
June 6, 2003